The New York Times
July 10, 1955

The H-Bomb Danger

An Analysis of Scientists' Warning Finds It Is Old and Omits Much

By WILLIAM L. LAURENCE

There is nothing new in the statement of nine leading scientists that "neither side can hope for victory in a nuclear war" and that "there is a very real danger of the extermination of the human race by dust and rain from radioactive clouds."

Early in 1950, shortly after President Truman had directed the Atomic Energy Commission "to continue with the development of the so-called hydrogen or super-bomb," the late Albert Einstein made the following statement:

"The hydrogen bomb appears on the public horizon as a probably attainable goal. * * * If successful, radioactive poisoning of the atmosphere, and hence annihilation of any life on earth, has been brought within the range of technical possibilities."

As early as 1947, long before the hydrogen bomb was even mentioned in public, Prof. Edward Teller, the principal architect of the hydrogen bomb, said that "the effects of an atomic war fought with greatly perfected weapons and pushed by utmost determination will endanger the survival of man."

Szilard Was Specific

Prof. Leo Szilard, one of the pioneers in the development of the atomic (fission) bomb, was even more specific. Speaking over the radio at a University of Chicago Round Table, in February, 1950, he estimated that the fusion of 400 tons of heavy hydrogen (deuterium) would be sufficient to "kill everybody on earth."

One ton of deuterium, if completely fused in a hydrogen bomb, would explode with an energy of one megaton, or million tons of TNT. It would liberate 125 kilograms of neutrons. Hence the fusion of 400 tons of deuterium would be the equivalent of 400,000,000 tons of TNT and would liberate as much as fifty tons of neutrons.

However, what the scientists' statement apparently ignores is the fact that the predictions made by Einstein, Teller, Szilard and many other nuclear scientists are predicated entirely on a special type of hydrogen bomb, the so-called cobalt bomb, which consists of a hydrogen bomb encased in a shell of cobalt.

In such a bomb, and in such a bomb only, the neutrons liberated per megaton of explosive energy would create a deadly cloud of radioactive cobalt equal to the radioactivity of some 5,000,000 pounds of radium. The explosion of a quantity of deuterium equal to 400,000,000 tons of TNT, if encased in shells of cobalt, would thus liberate in the atmosphere a deadly radioactive cloud equal to 2,000,000,000 pounds (1,000,000 tons) of radium.

Such an astronomical quantity of radioactivity, traveling around the world, would indeed be enough "to kill everybody on earth."

However, as Dr. Teller himself was the first to point out, "one limitation to such an attack [the use of a cobalt bomb] is the boomerang effect of these [radioactive] gases on the attacker himself. The radioactive gases would eventually drift over his own country, too." He warned, however, that, instead of using cobalt, which has a radioactive half-life of five years, the attacker could choose an element that has a much shorter radioactive decay period.

"With the proper choice," Dr. Teller said, "he (the attacker) could ensure that his victim would be seriously damaged by them [the short-lived radioactive gases] and that they would have decayed by the time they reached his own country."

As against this danger, there is, of course, the deterrent effect of the victim retaliating with similar short-lived radioactive clouds.

Here we come to the very heart of the problem, which again the Russell statement ignores—the deterrent effect of the fission as well as the fusion bomb against any temptation by an aggressor to unleash a nuclear war against a victim.

It was Sir Winston Churchill, in an address at the Massachusetts Institute of Technology, in Boston, on March 31, 1949, who first pointed to the deterrent effect of even the antedeluvian fission bomb of those days:

"I must not conceal from you tonight the truth as I see it," he said. "It is certain that Europe would have been communized like Czechoslovakia and London under bombardment some time ago but for the deterrent of the atomic bomb in the hands of the United States."

Strength of New Bombs

Since then we have developed fission bombs at least twenty-five times as powerful as the Hiroshima and Nagasaki bombs, and a wide variety of tailor-made tactical atomic weapons designed for use against armies in the field. These, both statesmen and military leaders agree, have served to neutralize the advantage of the vast superiority in numbers possessed by Russia and China.

It is also widely recognized that the deterrent effect serves mainly to discourage the aggressor. For the aggressor has the choice of whether to attack or not to attack, and it is therefore not regarded as likely that anyone in his right mind would choose to attack in the full knowledge that the price he would have to pay would be much greater than any possible gain he may expect.

The London statement also fails to take into consideration the fact, recognized by few even among nuclear physicists, that the normal hydrogen bomb gives off little dangerous radioactivity.

There are three types of materials that can be used in a fusion bomb. The most common is deuterium, or hydrogen of an atomic mass of 2, which exists in all the earth's waters in a ratio of one part in 5,000. Another is tritium, or hydrogen of atomic mass 3, which does not exist in nature and is very expensive to produce. A third element is light lithium, of atomic mass 6, which must be separated from heavy lithium of atomic mass 7. The heavier lithium constitues 92.5 per cent of all lithium found in nature.

All these elements, used singly or in combination, when fused in a thermonuclear weapon, give off only neutrons as a by-product. These neutrons enter any element in their vicinity. Hence when the casing of the fusion bomb is ordinary steel, the vaporized steel does not constitute a dangerous radioactive element, according to the best informed nuclear authorities.

The neutrons may also enter nitrogen atoms in the atmosphere and transform them into radioactive carbon of atomic mass 14. Such radioactive carbon has a radioactive decay period of nearly 6,000 years and the amount of such carbon that would be created is also not considered by top nuclear scientists as constituting a very serious danger to life.

Recently there has been reckless speculation about a so-called U-bomb, in which the element used is the abundant form of uranium of atomic mass 238. According to this speculation, the hydrogen bomb is not actually a fusion bomb, but a contraption described as a "fission-fusion-fission" bomb in which the principal explosive force comes not from fusion of light elements but from the fission of large quantities of Uranium-238.

Authorities of the highest competence have assured this writer that no such uranium bomb exists or could exist, as a fundamental law of nature makes it impossible. This law is that Uranium-238 cannot sustain a chain reaction.

Recently there has also been

Not to be reproduced without permission of the Western Reserve Historical Society, Cleveland, Ohio. This material may be protected by Copyright law (Title 17 U.S. Code)